

Taking the first hurdle

The effects of industry specific skills and support on survival during the founding process

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Sierdjan Koster

Urban and Regional Studies Institute

Faculty of Spatial Science, University of Groningen

P.O. Box 800, 9700 AV Groningen, The Netherlands

sierdjan.koster@rug.nl

Abstract

Spin-offs are considered successful founding efforts. The combination of relevant industry specific knowledge and direct support from a parent company make these firms stand out from the rest. Spin-offs are usually defined on the basis of the previous employment positions of the entrepreneurs. This method disregards the process of resource transfer that theoretically explains the differences in performance with other foundings. This paper offers an empirical analysis based on the actual resource transfer from parent firm to founding. Using the ERC dataset, entrepreneurial skills are used to explain the successful conclusion of the founding process. Having skills related to production seems to be beneficial, especially when the founding effort also receives support from the parent company. Receiving support as such does not render any positive results. Next to the effect of production skills, industry experience adds to the explanation of successful founding. It is probable that skills related to market knowledge, being part of a network, and reputation enhance chances of pre-entry survival as well.

1. Introduction

“The numerically dominant group of small businesses are those which are small today and, even if they survive, are always likely to remain small-scale operations” (Storey, 1994, p. 112). *“We know that many start-ups only persist for a short time. Within five years, about half of all initiatives suffer a quiet death. Of the initiatives which do survive, few offer a substantial number of jobs”* (Schutjens & Wever, 2000, p. 135-136). These statements leave little room for debate; exit is immanent for many new firms. And some firms meet this fate rather quickly. A fair share of all founding attempts do not even make it to the end of the founding process (Van Gelderen et al., 2003; Aldrich, 1999). The obstacles and problems faced in the founding process prove insurmountable.

Little is known about the factors influencing the successful completion of the founding process, or in other words, the pre-entry performance of firms. Literature on successful entrepreneurship has mainly focussed on the factors that influence post-entry performance indicators, such as employment growth (Hoogstra & Van Dijk, 2004), survival (Nielsen, 2001; Shane, 2005), and exit (Eriksson & Kuhn, 2004). Factors influencing pre-entry success remain largely hidden. Nevertheless, it is an interesting aspect of entrepreneurship, both from a scientific point of view and from a policy perspective. Assessing the pre-entry success fits in the current trend of research which focuses on entrepreneurial processes rather than purely on the outcomes (see for example Stam, 2003; Pen, 2002). For policy, it is important to know which founding efforts are most likely to reach the end of the founding process. Scarce resources can be directed to the founding efforts with the highest chance of succeeding.

In contrast to success in the nascent stages of entrepreneurship, performance after completing the founding process is well documented. Important factors that explain post-entry performance include learning and knowledge creation. Previous research has shown that industry experience, the working career, and the general education of entrepreneurs positively influence the post-entry performance of new firms (Storey, 1994; Nielsen, 2001; Schutjens & Wever, 2000; Dahl & Reichstein, 2005). These studies rely heavily on the assumption that a relevant background leads to relevant skills and knowledge to set up a firm. Although this relationship cannot be debated, it is theoretically more appropriate to focus on the skills themselves (Koster & Van Wissen, 2006). It is not the background that explains performance differences, it is the skills of the founders involved.

This paper explores the factors explaining the successful completion of the founding process by nascent entrepreneurs. It draws on existing work about post-entry performance with a focus on the influence of learning processes. In doing so, the paper takes an explicit resource-

based perspective; the skills and resources used by the entrepreneurs determine pre-entry performance, rather than the background characteristics of the entrepreneurs. The theoretical sections 2 and 3 elaborate upon the relation between skills, resources and founding success. Section 4 introduces the ERC dataset which forms the basis for the empirical analysis. The comprehensive ERC dataset allows for an empirical analysis that uses the available resources and skills directly. Section 5 offers results, section 6 concludes.

2. Resources and skills in the founding process

Whereas entrepreneurship studies often consider the backgrounds of the entrepreneur rather than their skills and abilities, organisational studies do commonly focus on the resources and capabilities of organisations (Helfat & Lieberman, 2002). “*Resources include all assets, capabilities, organizational processes, firm attributes, information, knowledge, etc. controlled by the firm that enable the firm to conceive of and implement strategies that improve its efficiency and effectiveness*” (Barney, 1991, p.101; Daft, 1983). New firm formation can be seen as the process of gathering and organising resources for a new firm. The founding process is completed when the resources are in place and the new firm is ready for operation. During the gestation period, entrepreneurs can use existing resources from other companies. Sometimes, entrepreneurs receive direct support from a parent company (Bernardt et al., 2002). It is more common though that entrepreneurs use prior experiences to establish the firm (Garvin, 1983). Industry experience endows entrepreneurs with the proper skills for competing in the relevant industry (Klepper, 2001a; Klepper, 2001b; Dahl & Reichstein, 2005; Shane, 2000). In these cases, individual skills are transferred to the new firm as human capital.

Human capital

Becker (1964) gives one of the first comprehensive accounts of human capital. He describes the ways in which individuals gather human capital (or skills) and how it influences their productivity and earnings. He makes an important distinction between general training and specific training in this respect. General training renders skills that are useful outside the firm that provides the training (Becker, 1964, p.11). The skills gained can be deployed in every setting. Management skills are a clear example, but also sale skills fall in this category. Transferring specific knowledge is more complex. Specific training has a larger positive effect for the providing firm than for other firms (p.18). In other words, general training results in skills that are easily deployed in other firms, whereas specific skills lose their merit outside the context of the source firm. It is too simplistic, though, to see both types of training as a dichotomy. They form the poles

of a spectrum and most training (and the resulting skills) will be somewhere between the two extremes. Becker (1964, p.18) indicates that pure specific training is unlikely to occur, which means that there is often a possibility to transfer the skills acquired to a different setting. Especially firms that are similar to the source firm can benefit. Following this reasoning, specific knowledge is often seen on the scale of the industry. Having a background in an industry renders advantages for entrepreneurs that stay active in the same industry (Klepper, 2001a; Agarwal et al., 2004).

Departing from Becker's argument, Brüderl et al. (1992) explicitly address the influence of an employment career on the skills of entrepreneurs. They distinguish between industry-specific and entrepreneur-specific human capital. Industry-specific skills involve an understanding of the relevant characteristics of a particular industry. The entrepreneur is able to identify profitable market niches and with knowledge of production productivity of the firm can be increased. Industry-specific knowledge has both a demand dimension and a supply or production dimension. Shane (2000; Eckhardt & Shane, 2003) highlights the demand component. Experience induces the recognition of possible markets (Shane, 2000 p.259). Although Shane sees an obvious relation between market information and prior experience in an industry, this relation might be more complex. For innovation, also user knowledge appears to be relevant (Boschma & Weterings, 2004; Shah & Tripsas, 2004). Coming from another industry, user entrepreneurs can accurately indicate the flaws of existing products and the needs of the market. Being former consumers, user entrepreneurs can identify niches a new firm can try to fill. Skills based on learning-by-using can be extremely useful inputs for new firms (Mole & Elliot, 1987).

Apart from industry-specific experience, Brüderl et al. (1992) distinguish entrepreneur-specific human capital. This type is related to prior spells of self-employment in which the entrepreneur gathered knowledge about administrative duties, management, and entrepreneurship. In other words, self-employment experience influences the organisational capital of the new firm. Like Becker's general knowledge, this type of experience is assumed to be industry independent.

A taxonomy of new firm formation types

Taking a resource-based view, new firms can be seen as new arrangements of partly existing resources. The founders of the firms are responsible for entering the resources into the new organizational structure. Existing firms are important sources of the foundings' inputs. The learning and experience argument show that entrepreneurs transfer part of the parent firms' skills to the founding. Via this indirect route, resources are transferred from parent firms to foundings. In some cases, a parent firm also directly allows the transfer of resources. The company, for

example as part of a back-to-core strategy, decides to help an employee to start a new independent business. New firms based on resources coming from a parent company are usually called spin-off companies. Most spin-off definitions emphasize the indirect resources transfer of human capital through job mobility (Garvin, 1983; Klepper, 2001a; Agarwal et al., 2004; Feldmann, 2002). However, some scholars choose a stricter definition in which also the direct support is required in order to call a new firm a spin-off (Bernardt et al., 2002; Lindholm, 1994). Figure 1 proposes a taxonomy of new firm formation types based on both kinds of resource transfer (see also Koster & Van Wissen, 2006). The x-axis denotes indirect resource transfer on the individual level, whereas direct support from parent firm to new firm is represented by the y-axis.

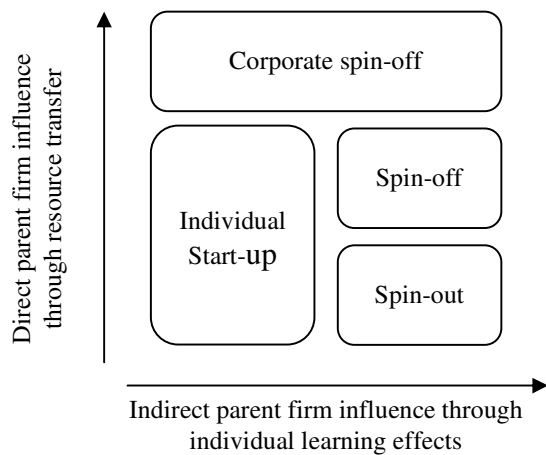


Figure 1: the influence of parent firms and new firm formation types

Four main founding types are distinguished in Figure 1: individual start-ups, spin-outs, (entrepreneurial) spin-offs, and corporate spin-offs. Each type is based on the specific combination of the parent firm's direct and indirect influence. There are no parent firms involved in the gestation process of *individual start-ups*. Individual start-ups are the outcome of personal efforts. Neither the gestation process, nor the skills entered by the entrepreneur are influenced by a source company. The firm will be owned totally by the entrepreneur, or the group of entrepreneurs. *Spin-outs* (see also Agarwal et al., 2004) are also characterised as stand-alone operations of individuals. In terms of Carroll and Hannan (1999), spin-outs are, like individual start-ups, assumed to be *de novo* entries. However, the spin-out entrepreneur bases the new firm on skills gathered as an employee. *Spin-offs* are a blended type in terms of influence. Both the entrepreneur and the parent firm play an important role in the founding process; indirect as well

as direct resource transfer occurs. Finally, new venture processes that are characterised by high levels of firm influence are called *corporate spin-off processes*. The creation of offspring is totally orchestrated by the parent company. As part of the strategic business plan, a new firm is formed. Substantive direct resource input from the parent firm is required for this. Capable individuals might be assigned as directors of these firms, but are not necessarily previously linked to the parent firm. During the gestation phase, the influence of individuals is limited. The parent company manages all input resources.

3. Performance in the founding process

The resource-based view of the firm entails a strong focus on performance. “*The value of any economic organisation (firm, business, company) derives from and reflects the value to it of the resources under its control...*” (Lewin & Phelan, 2000, p.61). The quality and availability of firm-specific resources in combination with the management of the resources determine the performance of new firms (Penrose, 1959).

Describing performance or success of firms is a thorny issue. Success is a concept with several sides to it, which makes it problematic to capture in measurable variables. Not the identification of success variables as such is a problem, but the interpretation of the variables is. Most indicators of success are related to the relative influence of the new firms in the economy. Prominent examples include the number of employees (Colombo & Grilli, 2003), employment growth (Hoogstra & Van Dijk, 2004; Koch & Strotman, 2004), turnover (Dahlstrand, 1997; Byrd, 2002), and survival (Nielsen, 2001). Success is a multi-faceted notion, which complicates the interpretation of the indicators. What seems to be a success from one point of view, could very well be a failure from another point of view. Small firms, for example, have little economic impact, but can be highly fulfilling, successful, and profitable for the entrepreneurs involved. The link between survival and success is even more problematic. A discontinued firm is not automatically a failure (Headd, 2003; Carroll & Hannan, 1999). Very profitable new firms are often sold to interested parties for good money. These firms are discontinued, but hardly failures.

A special aspect of firm survival is the ability to successfully start a new business, or as Van Gelderen (2003, p.1) puts it: “*The first success of a firm is its birth.*” This side of survival has been largely overlooked. The reason is obvious; it is expensive and time consuming to identify nascent entrepreneurs and follow their founding efforts over time. Nevertheless, regarding the foundings success of nascent entrepreneurs has certain advantages over traditional indicators of performance. The completion of the founding process seems purely related to the ability of the entrepreneur. It is unlikely that a nascent firm will be sold to another firm, or that

the founding process is terminated for some other positive reason. Reasons, goals, and motives for entrepreneurship are diverse, but it can be reasonably expected that every entrepreneur enters the founding process with the goal to actually end it. The resulting firms may differ greatly, but the wish to get the business up and running is always present. This makes it an indicator of success that is, unlike common measures of performance, not influenced by the personal motives of the entrepreneurs involved. Founding size, for example, is a function of the ability to start a new firm, but also of the entrepreneur's goals (Colombo et al., 2004).

The successful completion of the founding process is an interesting indicator of performance with certain advantages over traditional measures. However, the focus on the founding process precludes any information on the economic impact of the firm afterwards. Finishing the founding process is the firm's first achievement, but its economic impact is still unclear. Traditional measures remain of interest, as they address the economic impact of firms.

Hypotheses

New firms need to collect resources for production in order to become successful. Three groups of resource inputs have been identified. The first is industry-specific knowledge, which is transferred to the new firm via the specific skills of the entrepreneur. Spin-offs and spin-outs have been defined as new firms that are based on industry-specific resources. The second element is direct support (or resource transfer) from parent firm to new firm. Spin-offs benefit from both types of resources transfers. In the capacity of well-endowed firms, spin-offs and spin-outs are expected to outperform other foundings. Finally, new firms can also benefit from general resources that are part of the general skills of the entrepreneur. The three dimensions contribute to the performance of the new firm.

Industry-specific skills are primarily related to the production process of firms. Knowing the ins and outs of production entails an advantage over other competitors. Apart from the technological benefits, identifying profitable market niches is also dependent on the specific knowledge of an industry (Shane, 2000). Extensive product knowledge, related both to the production and the identification of niches, is likely to improve the founding success of companies.

Hypothesis 1: Foundings based on industry specific resources have better prospects of concluding the founding process. Spin-offs and spin-outs demonstrate better pre-entry performance than other foundings.

The second input group is direct support from the parent company. Spin-offs are based on direct support and have an easy way to tap into the resources of an existing firm, which helps to solve problems in the founding process. Support offers a safety net for the spin-off firm. It is, however, not necessarily a blessing. Entrepreneurship is often rooted in ideas of self-realisation and independence (Bais, 1999; Van Uxem & Bais, 1996). Dissatisfaction with the current working environment is an important reason to start a new firm (Noorderhaven et al., 1999). Entrepreneurs do value the support given by their previous employer, but eventually they could value independence even more. The influence of the parent firm can easily turn into a burden for entrepreneurs that strive for independence. Support can also have a negative influence on performance as it could induce less qualified entrepreneurs to take up entrepreneurship. The parent firm's support carries the entrepreneurs over the decision threshold. However, once the firm is operating, the entrepreneurs could prove to be less suitable for entrepreneurship. The resulting firms are less successful than firms started by entrepreneurs with the proper entrepreneurial spirit and qualities. All in all, the safety net function of support helps the entrepreneurs to survive the first phases of development, but it could also encourage 'pseudo-entrepreneurs' to start a firm with little success. However, this will become apparent after the successful completion of the founding process.

Hypothesis 2: Support positively affects pre-entry survival. Therefore, spin-offs outperform spin-outs and individual start-ups in the pre-entry phase.

The third group of resource inputs are the entrepreneur specific skills that encompass organisational knowledge. Experience as a manager or as an entrepreneur gives the entrepreneur the skills to manage the founding process and the resulting business. A good example of the impact of management on performance is described by Appold (2001). He shows that the management of available knowledge and skills directly influences the motivation and satisfaction of employees. Continuous mismanagement can lead to a situation in which employees do not function well and eventually leave the firm. This will compromise the availability and quality of the resources for production. The founding process itself can also benefit from trial-and-error experience.

Hypothesis 3: Entrepreneurs with superior organisational knowledge have better pre-entry survival chances than other entrepreneurs.

4. The ERC dataset

The empirical data used in this analysis comes from the Entrepreneurial Research Consortium (ERC) dataset. The ERC is an association of leading research institutes with a common interest in entrepreneurship. The consortium has its basis in the U.S. and most of its research efforts are concentrated here as well. Recently, the ERC methodology and survey have been adopted in other countries as well (see for example Van Gelderen et al., 2003 for Dutch case). However, the effort is still very much focussed on the U.S. Despite its focus on the U.S. case, the results of ERC studies are highly relevant for a better understanding of entrepreneurship in any context. One of the major accomplishments of ERC is the vast ERC dataset that offers comprehensive information on nascent entrepreneurs; it addresses backgrounds, goals, expectations, resources, and success of nascent entrepreneurs. The combined efforts of the participating universities and research institutes have resulted in a large and longitudinal panel dataset, which is unprecedented. The dataset is freely accessible through the internet.¹

The goal of the ERC dataset is to identify persons that are in the process of setting up a firm and follow them over time. A research population of 830 nascent entrepreneurs was identified in a screener survey. In order to qualify as nascent entrepreneur, three conditions had to be met. First, the respondent expects to own at least part of the new business. Second, there have been activities aimed at starting the business in the past 12 months. This condition guarantees dormant founding efforts to be left out. Third, the firm is not an infant firm, but is still in the founding phase. The last condition relates to the cash-flow of the firm. A firm with a cash-flow that covers expenses and the owner-manager salaries for at least three months is considered infant and the firm was consequently dropped from the population. After the selection process, the founding efforts of the nascent entrepreneurs were followed in four questionnaire waves (from 1998 to 2003). The research population of nascent entrepreneurs is not a random selection. Women and ethnic minority groups are over-represented in order to address specific research questions of the project's participants. In order to correct for this bias in the dataset, each analysis should be based on weighted versions of the case values. For a comprehensive account of the selection process and other particularities of the dataset, the accompanying dataset description by Reynolds (2000) should be consulted.

¹ <http://projects.isr.umich.edu/psed/>

5. Founding groups

The first step in the empirical analysis is to establish the founding groups based on indirect resource transfer and support (Figure 1). Indirect resource transfer, through job mobility, is represented by two variables which address the role of the entrepreneur's experience. The variables indicate whether a new firm has been based on the industry experience or the specific technological knowledge of the entrepreneurs involved (see Appendix 1). Industry experience and technological knowledge relate strongly to the actual production process. As a consequence, both variables can be seen as examples of specific learning processes. This respects the general notion that specific knowledge is the distinguishing element of spin-offs and spin-outs (Klepper, 2001a). Although the dominant spin-off definitions relate the accumulation of specific knowledge to industry experience, this relationship is not automatic. Firms outside the industry can also generate specific knowledge. Client firms, for example, can have a specific insight in the requirements of the market and base a new firm on this experience (Weterings & Koster, 2005; Boschma & Weterings, 2004). Likewise, specialised divisions can provide industry knowledge that lies beyond the sector of the company as a whole. Focussing on the actual transfer of resources implies that the source of the inputs is less relevant. The assumption that spin-offs (and spin-outs) originate from within an industry is relaxed.

Direct support from parent firm to new firm is, unfortunately, not conceptualised in the ERC dataset. The dataset does not contain information on the nature of support from other firms. However, there is information on the legal relation between parent company and the new firm. One variable indicates whether a parent company has an ownership share in the new firm, a second variable identifies firms that are started as part of an employee's job assignment. Direct resource transfer is assumed when a parent company is involved in one of both ways. This conceptualisation has the obvious set-back that there is no proof of actual resource transfer from a parent company to the new firm. However, it seems plausible that the new firm will receive assistance of the firm that is involved, either as the initiator or as future participant. The nature of the support remains unclear though. A second point for consideration is the possibility that the source firm of the indirect resource transfer is not the same firm that provides the support. A new firm can therefore be based on the industry experience gained in one firm and the support provided by another firm. This means that a spin-off can have two parents firms. As a result, the spin-off definition is not followed to the letter. However, the theoretical relations between resource inputs and performance are adequately conceptualised with this method. The focus on resources, rather than on the background of the entrepreneurs makes it possible to relax the spin-off definition slightly without compromising the theoretical issues.

Which founding groups result from this approach? Following the classification in Figure 1, (individual) start-up are identified as founding efforts that have indirect nor direct resources transfer. Spin-out entrepreneurs have relevant product or technological knowledge. However, there is no parent firm to fall back on. Finally, spin-offs score a ‘yes’ on both dimensions of resource transfer. Table 1 shows the groups’ relative shares.

	Wave I	Wave II	Wave III	Wave IV
Individual start-ups	38 %	36 %	29 %	37 %
Spin-outs	49 %	51 %	57 %	50 %
Spin-offs	13 %	13 %	14 %	13 %
N	557	441	316	327

Table 1: Founding groups in ERC dataset, own calculations (see also Appendix 1)

The waves show a very consistent division of the founding groups. The questions regarding indirect resource transfer are repeated each wave and because of this feature, entrepreneurs can shift from group to group. Nevertheless, the largest share of entrepreneurs remains in the same founding group throughout the study period. The group sizes in Waves I through IV offer a general understanding of the importance of the founding groups. The largest group is the spin-out group. This is in line with previous research that suggests most founders to have a background in the same industry (Garvin, 1983). Relevant knowledge input is suggested as the underlying principle and the above result adds to this idea. The spin-off group is the smallest, but still has a considerable size. Even using this strict definition, 13% of all new firms can be regarded as spin-offs. This is comparable to Danish results, which are also based on a rather strict definition of spin-offs (Dahl & Reichstein, 2005). Although the smallest group, spin-offs are hardly a fringe phenomenon. Especially when spin-off indeed outperform the other founding groups, the economic impact will be larger than the share of firms leads to expect.

6. Completing the founding process

The first battle has been won when a firm concludes the founding phase. The firm leaves the founding phase and can be considered a fully fledged firm. Several demarcation points can be used to pinpoint the conclusion of the founding phase; the first sale, hiring staff, registration at the Chambers of Commerce, getting equipment are possible demarcation points. None of these variables, however, applies to all firms in the same way. Many companies never hire employees and would therefore be unable to leave the founding phase. The first sale seems a rather solid estimator, but some firms are started to facilitate a sale which has been made at the beginning of

the founding process. The sale was there before the firm. Finally, founding processes are erratic and the founding phases (e.g. business idea, resource collection, registration, production, sale) are not followed in this order. In order to avoid these problems, the founding phase is assumed to end when the entrepreneur says so. Obviously, this method also has certain limitations. Entrepreneurs may be too positive about the founding processes and they can consider the founding processes concluded, while more objective measures lead to a different conclusion. Nevertheless, this method circumvents possible chronological pitfalls concerning the objective events in the founding process. There is also a practical reason. The question is used to track down the status of the new firm throughout the ERC dataset. Therefore, adopting the entrepreneurs' view on the status of the process makes comparison across the waves possible.

Descriptive analysis

Table 2 shows the shares of new operating businesses for each wave. The foundings did not conclude the founding phase previously. The number of cases drops over time, because the operating businesses of the previous wave are not taken into account in the new round. On top of that, there is the obvious problem of panel attrition. The founding groups are established separately for each wave. The upper row in the table contains the cases of operating businesses. In Wave I, as a result of the dataset's focus on nascent entrepreneurs, all efforts are considered to be in the founding phase ('active start-up' in ERC terms) and there are no cases of operating businesses. In one year (Wave II) about one third of all respondents manage to finish the founding process. Spin-outs perform best and reach a success rate of nearly 40%. Individual start-ups are clearly lagging behind the spin-offs and spin-outs. In Wave III and IV, the success rates drop considerably, especially in the start-up and spin-out group. The chances of reaching the end of the founding process drop when time is progressing. A thorough pre-entry process is usually considered a positive feature, because it is related with better post-entry performance (Van Gelderen, 1999). A serious and capable entrepreneur needs some time to organise the founding successfully. Within the founding process itself, time seems to be an enemy rather than a friend. The longer the founding process takes, the slimmer chances of ending the process become. A study using the Dutch version of the ERC dataset shows the same trend (Van Gelderen et al., 2003). The results are in line with the hypothesis that with the passing of time between initiation and full functioning, it is increasingly difficult to adjust the founding process to all changes in the environment (Hannan & Freeman, 1989). The entrepreneur has to act upon the environmental conditions as quickly as possible. Spin-offs seem to be the exception to this rule and the pre-entry success rate even peaks in wave IV. This result hints at the safety net function of the support

received. Even when the founding process proves to be complicated, the support of a parent firm ensures a successful conclusion.

	Individual start-ups				Spin-outs				Spin-offs			
	I	II	III	IV	I	II	III	IV	I	II	III	IV
Operating firm		24	12	15		38	25	16		32	27	47
Not operating	100	76	88	85	100	62	75	84	100	68	73	53
N	211	157	67	60	274	224	107	69	71	60	22	17

Table 2: Status of foundings (in percentages), using founding groups defined separately for each wave. Own calculation based on ERC dataset

The method used in Table 2 allows entrepreneurs to shift groups, because the founding groups are redefined in each wave. This means, that the analyses are necessarily cross sectional. In order to exploit the longitudinal nature of the data fully, the founding groups should be established in the first wave and then followed over time. In order to do so, a group of 249 loyal respondents was identified. These respondents participated in each of the waves and could be classified in one of the founding groups in the first wave. The group was followed over time and their founding success is presented in Table 3. Again, the expected order of the founding groups is confirmed. At the end of the study period, 59% of all spin-offs are operating businesses, and 88% of all spin-off firms reached the operating phase in one of the waves. The gap between the shares shows that some firms were started and discontinued within the study period. These firms reached the ‘operating business’ phase at one point, but are no longer operating in the last wave. The success shares for spin-outs and individual start-ups are considerably lower. However, spin-off firms seem to have higher mortality rates after the conclusion of the founding process. The gap between the share of firms that have reached the operating business phase and the share of firms that are still operating at the end of the research period is relatively large for spin-offs. Individual start-ups and spin-out more often remain in operation. This is in line with the argument that support is only profitable up to a point (Weterings & Koster, 2005). Firms need to stand on their own feet in order to become feasible businesses. However, there is an alternative explanation. Relatively many spin-offs are sold to others (20% of all operating spin-offs, 16% for individual start-ups and 4% for spin-outs). It seems that the discontinuation of spin-offs is frequently based on positive reasons. Unfortunately, the number of cases is too small to draw any substantive conclusions in this matter. Nevertheless, the large share of drop-outs is not necessarily a negative point. This only confirms the idea that firm survival is multi-interpretable as a performance indicator.

	Operating at end of period	Reached operating phase
Individual start-up (n=85)	34 %	49 %
Spin-out (n=130)	51 %	65 %
Spin-off (n=34)	59 %	88 %

Table 3: pre-entry success rates of loyal respondents (N=249)

Multivariate analysis

The descriptive statistics suggest that spin-offs and spin-outs outperform individual start-ups, capitalising on experience and the support from parent companies. In this section, the effect of specific skills and support on the successful completion of the founding process is assessed while controlling for other experience variables, including organisational knowledge and skills. The definitions of spin-offs and spin-outs emphasize the role of specialised knowledge of the production process. However, also general knowledge helps entrepreneurs to start their firm (Helfat & Lieberman, 2002). Next to that, there may be additional industry-specific knowledge, not captured in the definitions. Especially the role of market knowledge and network activities is not represented in the operationalisation used. These possible intervening effects are corrected for in the binominal regressions, presented in tables 4 and 5.

The influence of specific knowledge on the completion of the founding process is tested in six models. Models A, B1, and B2 (Table 4) use all eligible founding efforts in the dataset, whereas models C, D1, and D2 (Table 5) apply only to solo entrepreneurs. The variables included in the models represent the general knowledge, specific knowledge, and assets available to the entrepreneur. The dependent variable in all models is the dummy variable whether the founding effort was completed successfully in at least one of the four waves.

The dimension of general knowledge is captured by several indicators of experience. The most obvious variables are the age (ln) and educational attainment of the entrepreneurs (lnage & education). Both are expected to raise the chances of pre-entry success. General experience can also be understood in terms of management and entrepreneurship experience. These factors are especially relevant for the foundation process of new firms, because the entrepreneur picks up knowledge related to the organisation of businesses. The number of years employed in a management function (ln years employed as administrator) and coming from self-employment (self-employed) measure this effect. For solo entrepreneurs (Models C and D), the assistance in other founding efforts is also included (solo: helped other founding). All variables are supposed to positively influence the successful conclusion of the founding process.

The second dimension in the models is specific knowledge, which is measured in two ways. First, the variables used to define the founding groups represent specific knowledge (Appendix 2). These variables focus on the production side of specific knowledge. The classification variables are used in three ways. In models A and C, the founding groups are entered as nominal variables (founding group). In models B1 and D1, the variables used for the founding group classification are entered (Specific knowledge & support). Finally, in model B2 and D2, the interaction term between specific knowledge and support is added. The interaction term represents the spin-off group, including foundings based on specific product knowledge and support. Second, there is a dimension of specific knowledge not directly related to production. This side is not captured in the product knowledge used to identify spin-outs and spin-offs. Unfortunately, these additional skills as such are not present in the dataset, but the industry experience of solo entrepreneurs is. Learning effects that are not captured by the product related experience are captured by this variable, which appears in models C and D.

The final part of the models consists of the control variables. The variables refer to the structure of the founding and the assets available to it. Firstly, group efforts (Founding team) are generally understood to have higher chances of success (see for example Colombo & Grilli, 2003). In a group founding, the chances of complementing skills is higher which makes it easier to manage all sides of the foundation process successfully (Lazear, 2003). This variable is only included in models A and B, as the other models apply to solo entrepreneurs only. Secondly, having a job while starting up could have an effect as well (hybrid founding). On the one hand, it can provide the entrepreneur with an easy access to resources. On the other hand, it can indicate a lack of commitment to the foundation process. A lack of time or commitment has been shown to negatively affect performance (Van Uxem & Bais, 1996). Thirdly, the financial position of the entrepreneurs is important as well (Income). Setbacks in the founding process are easier to overcome when the financial position of the entrepreneur is good.

	Model A	Model B1	Model B2
General knowledge:			
Ln age entrepreneur	0.13 (0.45)	0.22 (0.45)	0.21 (0.46)
Education:			
Low	-0.96 (0.74)†	-0.81 (0.75)	-0.78 (0.75)
Middle	-1.13 (0.68)*	-1.06 (0.68)†	-1.02 (0.68)†
High (ref)	--	--	--
Ln years employed as administrator	-0.02 (0.03)	-0.02 (0.03)	-0.23 (0.03)
Self-employed (d)	1.55 (0.43)**	1.53 (0.42)**	1.72 (0.44)**
Specific skills:			
Founding group:			
Individual start-up	-2.02 (0.72)**		
Spin-out	-1.28 (0.70)*		
Spin-off (ref)	--		
Specific knowledge (d)		0.95 (0.38)**	0.42 (0.42)
Support (d)		0.05 (0.44)	-1.55 (0.75)**
Support x specific knowledge			0.89 (1.05)**
Assets / control:			
Income:			
Low	-0.92 (1.4)	-0.72 (1.32)	-1.03 (1.40)
Middle	0.44 (0.67)	0.43 (0.65)	0.47 (0.67)
High (ref)	--	--	--
Hybrid founding (d)	-0.20 (0.45)	-0.21 (0.45)	-0.29 (0.47)
Founding team (d)	0.72 (0.41)*	0.70 (0.40)*	0.73 (0.41)*
Gender (d, male = 1)	0.28 (0.39)	0.45 (0.38)	0.12 (0.40)
Heckman's Lambda	-1.62 (0.92)*	-1.79 (0.89)*	-1.37 (0.93)
Intercept	1.07 (5.34)	-1.96 (5.24)	-1.81 (5.30)
Nagelkerke R ²	0.33	0.31	0.36
-2 loglikelihood 0-model	240.93	240.93	240.93
-2 loglikelihood	190.23	194.11	185.59
N	182	182	182

Table 4: multivariate estimates of founding success for all foundings. binary logistic regression, dep. variable – founding success (1= founding process successfully completed), (d) – dummy variable, (ref) – reference group, SE-values in parentheses. † - significant at 10% level (one-sided confidence intervals), * - 5% level, ** - 1% level

Table 4 shows three specifications of the binary logistic regressions used to assess the effect of previous experiences and support on pre-entry success. Models A and B use the whole subset of loyal respondents, group foundings inclusive. The overall performance of the models is good. The R-square scores are reasonable and the individual influence of the variables is consistent in all specifications of the models.

Following the order of presentation in the table, we first turn to the general knowledge indicators. The influence of these indicators is rather weak. General learning types exert little influence on the founding success. Age does not play a role and also administrative or supervisory experience has no significant influence. The only beneficiary general background for self-employment is self-employment. This result is in accordance with literature on habitual entrepreneurship which regards entrepreneurship as a trial-and-error process with a higher chance of success after prior founding attempts (Alsos & Kolvereid, 1998). The entrepreneur gains organisational knowledge and deploys this in consecutive founding attempts. Hypothesis 3, regarding the positive influence of organisational skills, is therefore accepted. It should be borne in mind though, that the organisational skills are measured indirectly and that the result only applies to self-employment. Management experience has no influence. Education, finally, shows an unexpected pattern. Higher education leads to better founding chances compared to medium levels of education. This is in line with the expectations, as the general knowledge is assumed to be better for the higher educated. They can use this knowledge in the founding process. However, contrary to this argument, there is no statistically significant difference between the entrepreneurs with the highest and lowest education levels. Perhaps the group of poorly educated entrepreneurs has few alternatives to self-employment. The chances of finding a job as an employee are lower, which forces these entrepreneurs to finish the founding process.

The specific knowledge indicators show interesting results. In Model A, spin-offs clearly outperform the other foundings, but the difference between spin-outs and individual start-ups (not displayed) is not significant. The mixture of support and experience (i.e. spin-off) appears especially successful. This idea is confirmed in Model B1 and B2. Without the interaction term (B1), experience boosts the pre-entry success of firms. This is in line with Hypothesis 1; Product specific knowledge does lead to a smoother founding process. However, when the interaction term is added (B2), the single effects of experience and support diminish and the combination of support and product specific knowledge overpowers the other variables. Specific knowledge still has a positive sign, but is not significant. Support even contributes negatively to the founding success, which contradicts Hypothesis 2. The result is in line though with a negative effect of support on innovative output, as found by Weterings and Koster (2005). Apparently, receiving support as such does not help the new firm. However, the combination of product knowledge and support ensures a promising outcome of the founding process.

The control variables behave as expected. Entrepreneurs with low incomes have slimmer chances of surviving the founding phase. The income variable improves the models considerably in terms of R-square scores. It is therefore an important variable for explaining founding success.

Group efforts have higher chances of success. The sum of the entrepreneurs' knowledge and assets ensures better possibilities. Hybrid entrepreneurs have somewhat lower chances of finishing the founding process. This confirms the idea that the entrepreneur should be fully committed to the task in order to actually start the new firm. It does not necessarily mean that these entrepreneurs are less suited for the job. They simply have the possibility of returning to their previous employment when things go astray in the founding process. In contrast to the entrepreneurs with low educational attainment, they are not forced to end the founding process as the result of a lack of alternatives.

Models C and D (Table 5) use the subsample of solo entrepreneurs. The results are comparable to models A and B with a notable exception in the specific knowledge variables. In line with the first models, the impact of specific knowledge is significantly positive (Klepper, 2001a; Agarwal et al., 2004). Support is again negatively related to founding success. The accumulated effect of the main variables and the interaction variables is lower for supported foundings compared to unsupported foundings. However, in contrast to the case of all foundings (including group foundings), solo entrepreneurs do benefit from the combinatory effect of support and specific knowledge. The support of a parent firm may have a comparable positive effect as working in a team. In a team, the skills of the entrepreneurs are combined and problems can be faced together. For solo-entrepreneurs, the extra inputs in the founding process may be attracted from the parent company. It would explain the fact that support has no additional positive effect for team starts. A team of entrepreneurs is proficient. Additional help is not necessary. For solo-entrepreneurs the support (in combination with specific knowledge) seems more important.

Model C and D also include an additional variable which measures the industry experience of the entrepreneurs. This variable captures residual effects of industry experience. The industry experience variable has a significant positive influence on the conclusion of the founding process. Entrepreneurs take knowledge and skills, other than related to the product, from their previous employer to the new firm. This residual influence of industry experience involves the recognition of market opportunities (Shane, 2000; Shane, 2005) and the social status of the entrepreneur within the sector (Van Sorenson, 2004; Wissen, 2004). The entrepreneur can rely on reputation and an extensive network of contacts to effectively conclude the founding process.

	Model C	Model D1	Model D2
General knowledge:			
Ln age entrepreneur	-0.82 (0.68)	-0.49 (0.70)	-0.57 (0.74)
Education:			
Low	-1.16 (1.12)	-0.90 (1.14)	-1.00 (1.20)
Middle	-1.70 (1.02)*	-1.65 (1.00)*	-1.91 (1.08)*
High (ref)	--	--	--
Ln years employed as administrator	-0.01 (0.05)	0.00 (0.05)	0.00 (0.05)
Self-employed (d)	1.27 (0.77)*	1.31 (0.75)*	1.54 (0.81)*
Solo: helped other founding (d)	-0.45 (0.66)	-0.30 (0.64)	-0.91 (0.76)
Specific skills:			
Founding group:			
Individual start-up	-2.37 (1.24)*		
Spin-out	-1.20 (1.13)		
Spin-off (ref)	--		
Specific knowledge (d)		1.36 (0.78)*	0.76 (0.85)
Support (d)		-0.65 (0.74)	-3.82 (1.69)*
Support x specific knowledge			5.12 (2.09)**
Solo: industry experience (d)	1.84 (0.89)**	1.61 (0.91)*	1.26 (1.00)
Controls / assets:			
Income:			
Low	-3.68 (2.44)†	-2.52 (2.24)	-4.53 (2.62)*
Middle	-0.85 (1.38)	0.39 (1.26)	-0.19 (0.76)
High (ref)	--	--	--
Hybrid founding (d)	-1.97 (0.86)*	-1.81 (0.84)*	-2.51 (1.00)**
Gender (d, male = 1)	0.14 (0.63)	0.39 (0.61)	0.58 (0.66)
Heckman's Lambda	-0.95 (1.47)	-1.56 (1.40)	-0.44 (1.53)
Intercept	11.80 (8.33)†	5.85 (8.00)	8.12 (8.58)
Nagelkerke R ²	0.50	0.50	0.57
-2 loglikelihood 0-model	123.37	123.37	123.37
-2 loglikelihood	80.96	81.47	73.19
N	95	95	95

Table 5: multivariate estimates of founding success for solo entrepreneurs. binary logistic regression, dep. variable – founding success (1= founding process successfully completed), (d) – dummy variable, (ref) – reference group, SE-values in parentheses. † - significant at 10% level (one-sided confidence intervals), * - 5% level, ** - 1% level

Turning to the other variables, it becomes clear that very little has changed compared to the previous models. The results seem pretty robust. The R-square values for the subsample are higher than before, suggesting a good explanation of the variance in the models. The most important difference is the consistently negative influence of hybrid foundings. For solo entrepreneurs, hybrid foundings have significantly higher pre-entry failure rates than other

foundings. The easy solution of going back to employment seems more pregnant than in the context of group starts. Group dynamics could force entrepreneurs to continue with a difficult founding process, rather than returning to employment.

In conclusion, the founding success of firms can be explained rather well on the basis of the input resources. Hypothesis 1 is confirmed. Product specific knowledge enhances pre-entry performance. Hypothesis 2 is partly confirmed. Support does have a positive influence, but only in combination with product knowledge. Support as such has no positive influence on the founding success. Hypothesis 3 is also partly confirmed. Indeed, organisational knowledge seems to be important. However, this is only true for organisational knowledge gained in the context of self-employment. Management experience as an employee, also leading to organisational knowledge, does not increase founding success.

7. Conclusion

Spin-offs are considered successful founding efforts. The combination of relevant industry specific knowledge and skills concerning the production process and direct support from a parent company make these firms stand out from the rest. Several studies have found empirical evidence to back this statement up. Most of these studies define spin-offs on the basis of the previous employment positions of the entrepreneurs. This method disregards the process of resource transfer that theoretically explains the differences in performance with other foundings. This paper offers an empirical analysis based on the actual resource transfer from parent firm to founding.

Three founding groups have been defined based on the product specific knowledge of the founders and the influence of a third party. Spin-off entrepreneurs have product knowledge and the support, spin-outs rely on product knowledge, whereas individual start-up have to do without support or specific product knowledge. Spin-outs form the largest group and spin-offs are relatively rare. This is in line with previous findings that most entrepreneurs base their business ideas on experiences they have had with the product.

The founding success of the three founding groups is compared and explained. Success is conceptualised as the completion of the founding process. This is a rather atypical measure, but it has certain advantages over survival after foundation which overlooks positive reasons for discontinuation. Pre-entry survival links to failure more directly.

The results are encouraging and in line with what could be expected from the theoretical ideas on resource availability; well-endowed firms have good chances of successfully completing the founding process. Expectations hold in the case of spin-offs, but for spin-outs the story is not

so obvious. Although the descriptive statistics do suggest that spin-outs have a small edge over individual start-up, the differences are mostly small and not statistically significant. The positive role of product specific resources inputs on pre-entry survival is therefore not confirmed. The same conclusion applies to support; Support as such is not a recipe for pre-entry survival either. Support without any product feeling even results in lower founding chances. This adds to the idea that support is not a panacea for all entrepreneurial problems. If both elements are combined though, the prospects of the new firm are extremely good. It is the combination of support and product knowledge that accounts for the good reputation of spin-offs.

Additional results which relate less directly to spin-offs include positive effects of previous entrepreneurial experience and a background in the same industry. The first effect stresses the role of organisational skills in the founding process. The analysis makes clear that skills from self-employment are more important than managerial skill developed in previous supervising functions. Perhaps in later stages of development, especially in growing firms, managerial experience becomes more valuable. The second effect is the positive impact of having an industry background. This indicator lies outside the theoretical framework of resources and stresses the career background of the entrepreneur. Its positive influence indicates that product related knowledge is not the only factor explaining the success of firms. There are other types of resources that positively contribute to pre-entry survival. Knowledge related to the structure and market of the industry is a likely candidate. The entrepreneurs use their network and reputation in the founding process.

Resources and skills theoretically explain the success of new firms. However, the translation into empirical testing is still difficult. This study has shown that it is possible and the results are promising. Nevertheless, measuring resource inputs is tricky and needs further refinement. In order to advance the analysis, the relationship between industry experience and the resulting skills of the entrepreneurs deserves extra attention. The head-start of spin-offs over other founding efforts can then be addressed more explicitly.

Reference List

- Agarwal R., R. Echambadi, A.M. Franco & MB. Sarkar (2004). *Knowledge transfer through inheritance: spin-out generation, development and survival*. The Academy of Management Journal 47 (4) p. 501-522
- Aldrich H.E. (1999). *Organizations evolving*. Sage, London
- Alsos G.A. & L. Kolvereid (1998). *The business gestation process of novice, serial, and parallel business founders*. Entrepreneurship Theory and Practice p. 101-114
- Appold S.J. (2001). *The control of high-skill labor and entrepreneurship in the early US semiconductor industry*. Environment and Planning A 33 p. 2133-2160
- Bais J. (1999). *Startende ondernemers 1998*. Economisch Instituut voor het Midden- en kleinbedrijf, Zoetermeer
- Barney J. (1991). *Firm resources and sustained competitive advantage*. Journal of management 17 (1) p. 99-120
- Becker G.S. (1964). *Human Capital*. Columbia University Press, New York
- Bernardt Y., R. Kerste & J. Meijaard (2002). *Spin-off startups in the Netherlands: at first glance*. E.I.M., Zoetermeer
- Boschma R.A. & A.B.R. Weterings (2004). *The effect of regional differences on the performance of software firms in the Netherlands*. University of Utrecht, Utrecht
- Brüderl J., P. Preisendörfer & R. Ziegler (1992). *Survival chances of newly founded business organizations*. American Sociological Review 57 (2) p. 227-242
- Byrd C.A. (2002). *Profile of spin-off firms in the biotechnology sector: Results from the biotechnology use and development survey - 1999*. Statistics Canada, Canada
- Carroll G.R. & M.T. Hannan (1999). *The demography of corporations and industries*. Princeton University Press, Princeton
- Colombo M.G., M. Delmastro & L. Grilli (2004). *Entrepreneurs' human capital and the start-up size of new technology-based firms*. International journal of industrial organization 22 p. 1183-1211
- Colombo M.G. & L. Grilli (2003). *Does founders' human capital affect the growth of new technology-based firms? a competence-based perspective*. Milan
- Daft R. (1983). *Organization theory and design*. West, New York
- Dahl M.S. & T. Reichstein (2005). *Are you experienced? Prior experience and the survival of new organizations*. Danish Research Unit for Industrial Dynamics, Aalborg
- Dahlstrand A.L. (1997). *Growth and inventiveness in technology-based spin-off firms*. Research Policy 26 p. 331-344
- Eckhardt J.T. & S.A. Shane (2003). *Opportunities and entrepreneurship*. Journal of management 29 (3) p. 333-349
- Eriksson T. & J.M. Kuhn (2004). *Firm spin-offs in Denmark 1981-2000 - patterns of entry and exit*. Department of Economics, Aarhus School of Business, Aarhus
- Feldmann M.P. (2002). *The locational dynamics of the U.S. biotech industry: knowledge externalities and the anchor hypothesis*. TEG-conference, Groningen
- Garvin D.A. (1983). *Spin-offs and the new firm formation process*. California Management Review 25 (2) p. 3-20
- Gelderen M.v. (1999). *Ontluikend ondernemerschap*. EIM, Zoetermeer
- Gelderen M.v., A.R. Thurik & N. Bosma (2003). *Success and risk factors in the pre-startup phase*. EIM, Zoetermeer
- Hannan M.T. & J. Freeman (1989). *Organizational ecology*. Harvard University Press, Cambridge

- Headd B. (2003). *Redefining business success: distinguishing between closure and failure*. Small Business Economics 21 p. 51-61
- Helfat C.E. & M.B. Lieberman (2002). *The birth of capabilities: market entry and the importance of pre-history*. Industrial and Corporate Change 11 (4) p. 725-760
- Hoogstra G.J. & J.v. Dijk (2004). *Explaining firm employment growth: does location matter?* Small Business Economics 22 p. 179-192
- Klepper S.J. (2001a). *Employee startups in high-tech industries*. Industrial and Corporate Change 10 (3) p. 639-674
- Klepper S.J. (2001b). *The evolution of the U.S. automobile industry and Detroit as its capital*. Carnegie Mellon University, Pittsburgh, DRUID Academy Winter 2002 PhD Conference
- Koch A. & H. Strotman (2004). *The impact of regional and functional intergration on the post-entry performance of knowledge intensive business service firms*. Presented at the ERSA conference 2004, Porto
- Koster S. & L.J.G.v. Wissen (2006). Inherited resources and company support as a basis for new firm formation. A taxonomy of founding types: start-ups, spin-outs, and spin-offs. In: Karlsson C., B. Johansson & R. Stough. *Entrepreneurship and Dynamics in a Knowledge-Economy*. Routledge,
- Lazear E.P. (2003). *Entrepreneurship*. IZA, Bonn
- Lewin P. & S.E. Phelan (2000). *An Austrian theory of the firm*. Review of Austrian Economics 13 (1) p. 59-79
- Lindholm A. (1994). *The economics of technology-related ownership changes. A study of innovativeness and growth through acquisitions and spin-off*. Chalmers University of Technology, Gothenburg
- Mole V. & D. Elliot (1987). *Enterprising innovation. An alternative approach*. Frances Pinter Publishers, London
- Nielsen P.B. (2001). *Statistics on new enterprises, the entrepreneurs and the survival of the start-ups*. Organisation for Economic Co-operation and Development
- Noorderhaven N.G., A.R.M. Wennekers, G. Hofstede, A.R. Thurik & R.E. Wildeman (1999). *self-employment out of dissatisfaction: an international study*. IRIC / EIM, Tilburg/Zoetermeer
- Pen C.J. (2002). *Wat beweegt bedrijven; besluitvormingprocessen bij verplaatste bedrijven*. Rijkuniversiteit Groningen, Groningen
- Penrose E.T. (1959). *The theory of the growth of the firm*. Blackwell, Oxford
- Schutjens V.A.J.M. & E. Wever (2000). *Determinants of new firm success*. Papers in Regional Science 79 p. 135-159
- Shah S. & M. Tripsas (2004). *When do user-innovators start firms? Towards a theory of user entrepreneurship*. University of Illinois, Urbana-Champaign
- Shane S.A. (2000). *Prior knowledge and the discovery of entrepreneurial opportunities*. Organization science 11 (4) p. 448-469
- Shane S.A. (2005). *A general theory of entrepreneurship. The individual-opportunity nexus*. Edward Elgar, Cheltenham, Northampton
- Stam E. (2003). *Why butterflies don't leave. Locational evolution of evolving enterprises*. University of Utrecht, Utrecht
- Storey D.J. (1994). *Understanding the small business sector*. Routledge, London
- Uxem F.W.v. & J. Bais (1996). *Het starten van een eigen bedrijf: ervaringen van 2000 starters*. EIM, Zoetermeer
- Weterings A.B.R. & S. Koster (2005). *Inheriting knowledge and sustaining relationships: What stimulates the innovative performance of software firms in the Netherlands?* DRUID Academy Winter 2005 PhD conference, Aalborg

Appendix 1. Establishing founding groups

The following variables have been used to establish the founding groups:

1. Indirect resource transfer through the entrepreneur (Wave I – IV):

Qa5b – My experience in a particular industry or market led to my business idea,
1 = yes, 2 = no

Qa5h – My knowledge or expertise with a specific technology led to my business idea,
1 = yes, 2 = no

Condensed form of the variables (own calculation):

Exp – Business is based on experience

1 = yes, if Qa5b = 1 or Qa5h = 1

0 = no, if Qa5b = 2 and Qa5h = 2

These questions are asked in each of the questionnaire waves. The names of the variables in wave 2 are Ra5b and Ra5h, in wave 3 Sa5b and Sa5h, and in wave 4 Ta5b and Ta5h.

2. Direct resource transfer from existing firm (Wave I only):

Autonsu - Autonomous start-up scale,

1 = no outside influence, 2 = <50% No Person, independent start-up, 3 = <50% No Person, Franchise MLM, 4 = <50% No Person, business sponsor, 5 = >51% No Person own, 6 = 100% No Person own

Q101 – Is this business start-up effort on your own, as part of your current job, or as a mixture of both?

1 = start-up of own, 2 = start-up for employer, 3 = mixture of both

Condensed form of the variables (own calculation):

Infl – Business has experienced outside influence

1 = yes, if Autonsu \neq 1 or q101 \neq 1

0 = no, if Autonsu = 1 and q101 = 1

3. Defining the founding groups (own calculation):

Groups – Classification of the founding efforts

1 = Individual start-up, if exp = 0

2 = Spin-out, if exp = 1 and infl = 0

3 = Spin-off, if exp = 1 and infl = 1

Appendix 2: Variables in binary logistic regressions

Dependent variable:

Opublicany (dummy) – Did the start-up effort reach the operating business status in one of the waves?

Independent variables:

General education:

Itrwage (ln) – Respondent Age

Useduc3 – Respondent Education, 3 groups

Administrative skills:

Q341 – For how many years, if any, did you have managerial, supervisory, or administrative responsibilities?

Q332 (dummy) – Are you a small-business owner or self-employed?

Q200sk (dummy) – Have you helped starting up any other businesses? (solo entrepreneurs only, based on Q200)

Founding groups / specific knowledge:

Groups – Founding groups

Infl (dummy) – Does the business experience any outside influence (see appendix 4.2)?

Exp (dummy) – Is the business based on previous experience (see appendix 4.2)?

Q199sk (dummy) – Have you had work experience in this business? – the one where the new business will compete. (solo entrepreneurs only, based on q199)

Controls / assets::

Q116 (dummy) – Has a start-up team been organized?

Q331 (dummy) – Are you working for others for pay?

USHHINC3 – Respondent annual HH Income – 3 groups